In the Claims:

1. (Currently Amended) A method for authenticating an authentic article having an authentication mark, comprising the steps of:

(a) acquiring a set of hyper-spectral images of at least a part of the authentication mark~~;~~, by using a spectral imaging and analysis system operative according to a hyper-spectral mode of spectral imaging and analysis;

(b) forming a set of single-authentication mark hyper-spectral fingerprint data from said set of acquired hyper-spectral images of said hyper-spectrally imaged authentication mark;

(c) identifying at least one spectral shift in said set of single-authentication mark hyper-spectral fingerprint data associated with said hyper-spectrally imaged authentication mark, for forming an intra-authentication mark physicochemical region group including a plurality of sub-sets of intra-authentication mark hyper-spectral fingerprint pattern data, such that value of at least one selected data element in each said sub-set is shifted relative to value of each corresponding said data element in each remaining said sub-set in same said intra-authentication mark physicochemical region group;

(d) forming a set of intra-authentication mark physicochemical properties and characteristics data relating to said hyper-spectrally imaged authentication mark, by performing pattern recognition and classification analysis on said intra-authentication mark physicochemical region group of said hyper-spectrally imaged authentication mark; and

(e) comparing and matching values of elements in said set of intra-authentication mark physicochemical properties and characteristics data relating to said hyper-spectrally imaged authentication mark to values of corresponding reference elements in a reference set of intra-authentication mark physicochemical properties and characteristics data of the authentic article, thereby authenticating the authentic article.

2. (New) The method of claim 1, wherein step (a), the authentic article is positioned upon a support device or mechanism which statically supports and holds the authentic article while the authentic article is hyper-spectrally imaged.

3. (New) The method of claim 1, wherein step (a), the authentic article is positioned upon a support device or mechanism which dynamically supports, holds, and transports, the authentic article while the authentic article is hyper-spectrally imaged.

4. (New) The method of claim 1, wherein said spectral imaging and analysis system is operative according to an off-line stationary mode, such that throughput time for performing entire process of said spectral imaging and analysis of the authentic article is in a range of between about 10 seconds and about 60 seconds.

5. (New) The method of claim 1, wherein said spectral imaging and analysis system is operative according to a high speed discontinuous (staggered) mode, such that throughput time for performing entire process of said spectral imaging and analysis of the authentic article is in a range of between about 100 milliseconds and about 60 seconds.

6. (New) The method of claim 1, wherein said spectral imaging and analysis system is operative according to a high or ultra-high speed continuous mode, such that throughput time for performing entire process of said spectral imaging and analysis of the authentic article is in a range of between about 10 milliseconds and about 100 milliseconds.

7. (New) The method of claim 6, wherein said continuous mode is performed by continuously scanning individual lines of the authentic article.

8. (New) The method of claim 1, wherein step (a), said spectral imaging and analysis system includes a plurality of two or more separately operable or multiplexed individual illumination energy source and optical units, for transmitting incident electromagnetic radiation of different individual wavelengths upon said part of the authentication mark.

9. (New) The method of claim 1, wherein step (c) involves analyzing said set of acquired hyper-spectral images for particular hyper-spectral images, such that said value of at least one selected data element in each said sub-set is shifted on order of about parts per thousand level relative to said value of each corresponding said data element in each said remaining sub-set in same said intra-authentication mark physicochemical region group.

10. (New) The method of claim 1, wherein step (c), different said sub-sets of intra-authentication mark spectral fingerprint pattern data in said intra-authentication mark physicochemical region group are intra-authentication mark physicochemical region group sub-set identifiers, used for distinguishing among said plurality of said sub-sets of intra-authentication mark spectral fingerprint pattern data associated with same said set of single-authentication mark spectral fingerprint data.

11. (New) The method of claim 1, wherein step (c), said at least one selected data element is emitted energy emitted by said hyper-spectrally imaged authentication mark, or, intensity or amplitude of said emitted energy.

12. (New) The method of claim 1, wherein step (c), said at least one selected data element is emitted energy emitted by said hyper-spectrally imaged authentication mark, and, intensity or amplitude of said emitted energy.

13. (New) The method of claim 1, wherein step (d), said plurality of sub-sets of intra-authentication mark hyper-spectral fingerprint pattern data featured in said intra-authentication mark physicochemical region group are correlated with a corresponding plurality of intra-authentication mark physicochemical region types, for a number of different types of said intra-authentication mark physicochemical regions identified in, or assigned to, said hyper-spectrally imaged authentication mark.

14. (New) The method of claim 13, wherein each said intra-authentication mark physicochemical region type is associated with a different set of physicochemical properties and characteristics data of said hyper-spectrally imaged authentication mark.

15. (New) The method of claim 1, wherein step (d), a said sub-set of intra-authentication mark spectral fingerprint pattern data is included in said intra-authentication mark physicochemical region group, for correlating line or edge effects present in said hyper-spectrally imaged authentication mark detected during said hyper-spectral imaging of the authentication mark.

16. (New) The method of claim 1, wherein step (e) is performed according to an established authentication criterion or specification based on having a pre-determined minimum number of matched values of said data elements during and/or following said comparing of said sets of intra-authentication mark physicochemical properties and characteristics data.

17. (New) The method of claim 1, used for determining non-authenticity of a non-authentic article having a non-authentic authentication mark, wherein following performing steps (a) - (d) for said non-authentic article, the method further comprises comparing and mismatching values of elements in said set of intra-authentication mark physicochemical properties and characteristics data relating to said hyper-spectrally imaged non-authentication mark, to said values of corresponding reference elements in said reference set of intra-authentication mark physicochemical properties and characteristics data of the authentic article, thereby determining said non-authenticity of said non-authentic article.

18. (New) The method of claim 1, wherein the authentic article is selected from the group consisting of a printed paper form of a monetary currency, a bank note, a check, a company or stock certificate; a printed plastic (laminated) card form of a monetary currency; and a printed paper or plastic (laminated) card form of an identification or other legal document.

19. (New) The method of claim 1, wherein the authentic article is composed of, or includes, a micron sized non-metallic or metallic fiber, thread, or ribbon, or, a micron sized printed integrated electronic circuit or chip.

20. (New) The method of claim 1, wherein the authentic article is composed of, or includes, protein or nucleic acid (DNA) molecules or molecular fragments.

21. (New) The method of claim 1, wherein the authentic article is composed of, or includes, a non-living or living microorganism.

22. (New) The method of claim 1, wherein the authentic article is composed of, or includes, an essentially flat and smooth two-dimensional pattern or design, or, an elevated or contoured and rough, three-dimensional pattern or design.

23. (New) The method of claim 1, wherein the authentic article is composed of, or includes, a plurality or composite (physical overlay) of two or more single essentially flat and smooth two-dimensional patterns or designs, or, a plurality or composite (physical overlay) of two or more single elevated or contoured and rough, three-dimensional patterns or designs.